



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/035,690	11/08/2001	Chao-Cheng Chen	67,200-560	3365

7590

04/14/2003

TUNG & ASSOCIATES

Suite 120

838 W. Long Lake Road

Bloomfield Hills, MI 48302

EXAMINER

VU, DAVID

ART UNIT

PAPER NUMBER

2818

DATE MAILED: 04/14/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/035,690

Applicant(s)

CHEN ET AL.

Examiner

DAVID VU

Art Unit

2818

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 08 November 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1-4, 9-16 and 19 are rejected under 35 U. S. C. 102(b) as being anticipated by Tobben et al., (US 6,103,456).

Regarding claims 1-4, 9-16 and 19, Tobben et al., in related text (Col. 1, Line 66-Col. 2, Line 11; Col. 8, Line 50-Col. 9, Line 39) and figures (Figs. 1C-1F) disclose a method for preventing the occurrence of undeveloped photoresist in semiconductor manufacturing process comprising the steps of:

providing an anisotropically etched first opening extending through a thickness of layers sequentially including a dielectric anti-reflectance layer (DARC) SiON 23 , a metal nitride SiON layer 23, and an insulating layer SiON 23 via opening in closed communication with a conductive region 22 underlying the insulating layer 21 (Fig. 1C);

forming a resinous TiN layer 28 over the at least one DARC/metal nitride layer 23 to include filling the first opening (Fig. 1D);

Art Unit: 2818

removing the resinous layer 28 overlying the etched opening to form a plug filling the first opening (Fig. 1E);

forming a photoresist layer 29 over the at least one DARC/metal nitride layer 23 for lithographically patterning a second opening disposed over the first opening;

lithographically patterning a second opening disposed over the first opening to expose a portion of the at least one metal nitride layer forming an etching pattern;

anisotropically etching according to the etching pattern through at least a thickness of the at least one DARC/metal nitride/dielectric layer 23 to include at least a portion of the plug 28 (Fig. 1F); and anisotropically etching according to the etching pattern through a thickness portion the insulating layer to form the second opening and a remaining portion of the first opening second opening disposed substantially over the remaining portion of the first opening.

Regarding claims 5-7 and 17-18, wherein the DARC/metal nitride/dielectric layer 23 is deposited according to a chemical vapor deposition process (Col. 1, Lines 22-32)

Regarding claim 8, wherein the resinous layer comprises a photoresist resin flowable at room temperature (Col. 14, Line 61-Col. 15, Line 15).


Regarding claim 20, wherein the lithographic process is deep ultraviolet (DUV) process (Col. 6, Lines 20-33).

### **Conclusion**

2. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Vu whose telephone number is (703) 305-0391. The examiner can normally be reached on Monday-Friday from 8:00am to 5:00pm. If attempt to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms., can be reached on (703) 308-4910.

DV

David Vu.



**David Nelms**  
**Supervisory Patent Examiner**  
**Technology Center 2800**